

Assemble the joints according to the manufacturer's recommendations.

## **B. Fabrication**

General Provisions 101 through 150.

## **C. Acceptance**

Have the manufacturer test the joint tightness according to ASTM D 3212 and certify the results according to Subsection 106.05.

## **D. Materials Warranty**

General Provisions 101 through 150.

# **Section 847—Miscellaneous Pipe**

## **847.1 General Description**

This section includes the requirements for water, storm drain, and sewer pipes. The pipe types are:

- Galvanized steel pipe and fittings
- Steel water pipe
- Copper pipe tubing
- Steel sewer pipe and casing pipe
- Plastic water pipe
- Plastic truss sewer pipe
- Polyvinyl chloride (PVC) sewer pipe and fittings

### **847.1.01 Related References**

#### **A. Standard Specifications**

Section 106—Control of Materials

Section 848—Pipe Appurtenances

#### **B. Referenced Documents**

<b>ANSI B 16.3</b>	<b>ASTM</b>		
AWWA	A 53/A53M	D 2239	F 477
C 201	A 139	D 2241	F 714
C 202	B 88 (B 88M)	D 2680	F 794
C 203	D 1248	D 3034	F 949
C 205	D 1784	D 3212	F 1483
C 301	D 1785	D 3350	
C 900			

## **847.2 Materials**

Each item under this section requires a certification from the manufacturer according to Subsection 106.05, "Materials Certification."

### **847.2.01 Galvanized Steel Pipe and Fittings**

#### **A. Requirements**

##### **1. Type**

Use galvanized steel pipe that meets the requirements of ASTM A 53/A 53M. Use standard weight pipe unless otherwise specified.

## 847.2.02

2. Use fittings of malleable iron that meets the requirements of ANSI B 16.3, except the nipples and couplings shall be the same material as the pipe.

### B. Fabrication

Hot-dip galvanize all fittings, nipples, and couplings according to ASTM A 53/A 53M.

### C. Acceptance

The Department will accept the pipe and fittings based on the certification or on the results of tests conducted by the Department.

### D. Materials Warranty

General Provisions 101 through 150.

## 847.2.02 Steel Water Pipe

### A. Requirements

1. Type

Use materials and requirements indicated in the table:

Material	Meet Requirements of:	Other Requirements
Pipe and fittings	AWWA C 201 or C 202	Use Grade B steel plate. Designate the pipe by operating pressure class.
Bell and spigot joints	AWWA C 202	
Rubber gasket material	AWWA C 301	
Steel-bolted couplings	Subsection 848.2.02	You may join plain-end steel pipe with steel-bolted couplings.
Cement mortar linings	AWWA C 205	
Coal-tar enamel lining and coating	AWWA C 203	

### B. Fabrication

General Provisions 101 through 150.

### C. Acceptance

The Department will accept the pipe based on the certification.

### D. Materials Warranty

General Provisions 101 through 150.

## 847.2.03 Copper Pipe Tubing

### A. Requirements

Use pipe or tubing that meets the requirements of ASTM B 88 (B 88M), Type K.

### B. Fabrication

General Provisions 101 through 150.

### C. Acceptance

The Department will accept the tubing based on the certification.

### D. Materials Warranty

General Provisions 101 through 150.

**847.2.04 Steel Sewer Pipe and Casing Pipe****A. Requirements**

Type: Use the material and requirements indicated in the table:

<b>Material</b>	<b>Meet Requirements of:</b>	<b>Other Requirements</b>
Steel sewer pipe and casing pipe	ASTM A 53/A 53M or ASTM A 139	The hydrostatic test is not required.
Bell and spigot joints	AWWA C 202	
Rubber gasket material	AWWA C 301	
Steel-bolted couplings	Subsection 848.2.02	You may join plain-end steel pipe with steel-bolted couplings.
Cement mortar linings	AWWA C 205	
Coal-tar enamel lining and coating	AWWA C 203	

Unless the Plans specify otherwise, use standard weight pipe.

**B. Fabrication**

General Provisions 101 through 150.

**C. Acceptance**

The Department will accept the pipe based on the certification or on the results of tests conducted by the Department.

**D. Materials Warranty**

General Provisions 101 through 150.

**847.2.05 Plastic Water Pipe****A. Requirements**

Type: Use polyethylene (PE) pipe and tubing that meet the requirements of ASTM D 2239 and ASTM F 714, as they apply to PE3408. Use the following pipe sizes and standards:

<b>Pipe Size</b>	<b>Pressure Rating</b>	<b>Other Requirements</b>
1/2 to 3 in (15 to 80 mm) meets ASTM D 2239	200 psi (1.4 MPa) or as specified by Engineer	SDR (standard thermoplastic pipe dimension ratio) = 7
3 to 42 in (*80 to 1050 mm) meets ASTM F 714	As specified by Engineer	SDR (standard dimension ratio) as specified by Engineer. Use the Iron Pipe Size system.
*Use 3 to 42 in (80 to 1050 mm) pipe for new construction and for replacing old piping systems used to transport water, municipal sewage, industrial process liquids, effluents, slurries, etc., in both pressure and non-pressure systems.		

1. Water Service Line Pipe: Use polyvinyl chloride (PVC) pipe that meets the requirements of ASTM D 2241, SDR 21, ASTM D 1785 Schedule 40, or ASTM F 1483, Class 200, (PVC0). Use a PVC compound that meets or exceeds the requirements of ASTM D 1784, Class 12454 B.
2. Water Main Pipe: Use 4 to 12 in (100 to 300 mm) diameter PVC pipe that meets the requirements of AWWA C 900. See the Plans for the designated dimension ratio (DR).

**B. Fabrication**

Extrude the pipe from resin that meets the requirements of ASTM D 3350 with a cell classification of PE345434 C, and ASTM D 1248 pipe-grade resin Type III, Class C, Category 5, Grade P 34.

**C. Acceptance**

The Department will accept the pipe based on the certification or on the results of tests conducted by the Department.

**D. Materials Warranty**

General Provisions 101 through 150.

**847.2.06 Plastic Truss Sewer Pipe****A. Requirements**

Type: Use plastic truss sewer pipe, couplings, and fittings that meet the requirements of ASTM D 2680, acrylonitrile butadiene-styrene (ABS), and polyvinyl chloride (PVC) composite sewer piping.

**B. Fabrication**

General Provisions 101 through 150.

**C. Acceptance**

The Department will accept the pipe based on the certification.

**D. Materials Warranty**

General Provisions 101 through 150.

**847.2.07 Polyvinyl Chloride (PVC) Sewer Pipe and Fittings****A. Requirements**

## 1. Type

Use PVC sewer pipe, couplings, and fittings that meet the requirements of ASTM D 3034 (SDR 35), ASTM F 949, or ASTM F 794 (min. pipe stiffness series 46). Ensure that the joints have elastomeric seals that meet the requirements of ASTM F 477.

## 2. Certification

Certify the joint tightness according to ASTM D 3212 and submit a certification according to Subsection 106.05, "Materials Certification."

**B. Fabrication**

Assemble the pipe according to the manufacturer's recommendations.

**C. Acceptance**

The Department will accept the pipe based on the certification.

**D. Materials Warranty**

General Provisions 101 through 150.

## **Section 848—Pipe Appurtenances**

**848.1 General Description**

This section includes the requirements for all pipe appurtenances, such as:

- Rubber gaskets
- Steel-bolted couplings
- Gate valves
- Sterilizing agents
- Bituminous plastic cement

**848.1.01 Related References****A. Standard Specifications**

Section 106—Control of Materials

Section 843—Concrete Pipe